

Colloquium

SFB 956

Conditions and Impact of Star Formation

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KOSMA room | 2:00 pm | supplementary colloquium

Physikalische Institute Köln

Lecture Hall III

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What we Learned from Surveying the Galaxy in [CII] with Herschel HIFI

We present results of a survey of the [CII] 158 μ m fine-structure line sampled over the entire Galactic Plane. These observations were carried out using the Herschel Space Observatory as part of the Open Time Key project, GOT C⁺, with spectrally resolved data from the HIFI instrument. The [CII] line traces different phases of the interstellar medium (ISM), including the diffuse ionized medium, warm and cold atomic clouds, clouds in transition from atomic to molecular, and dense and warm photon dominated regions (PDRs). The [CII] 158 μ m line is the brightest far-infrared line cooling line galaxies, representing 0.1 to 1% of their FIR continuum emission. It is therefore a potentially powerful tracer of star formation activity. We used the [CII] emission together with lines of HI, ¹²CO, and ¹³CO to derive the distribution of the different phases of the ISM in the plane of the Milky Way, including the CO-dark H₂ component, which is molecular gas not traced by CO but by [CII]. We also compared the [CII] emission and surface density of the different ISM phases with the Galactic star formation rate distribution, which is derived using radio continuum data. We put our results in the context of using the Milky Way as a template for understanding distant galaxies.

